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ALFRED BOWER TAYLOR.

Alfred Bower Taylor, son of Joseph Taylor, was born January 6, 1824, at his parents' home, 448 N. Sixth Street; Philadelphia. He was educated at Haddington Boarding School, and at the University of Pennsylvania, graduating from the latter institution in 1841. He entered the drug business after leaving the University, Henry C. Blair, 800 Walnut Street, Philadelphia, being his preceptor. He graduated from the Philadelphia College of Pharmacy in 1844. Subsequently going to New York, he entered the establishment of Rushton & Co., on Broadway, afterwards engaging with Hegeman & Co., prominent druggists of that city. Returning to Philadelphia in 1847, he bought the drug store at the Northeast corner of Eleventh and Walnut Streets, from the executors of the Estate of Augustine Duhamel. Here he remained until 1853, when he moved to larger quarters at the Southeast corner of Ninth and Walnut Streets. He continued in business at this location for seven years, and in 1861 moved to a larger store at 1015 Chestnut Street, where he conducted a successful business. In 1876 he moved to 31 S. Eleventh Street, and, after continuing in business at this location for five years, again moved, going to Ninth Street below Chestnut, under the Continental Hotel, and it was after being there a few years that he retired from business. During the remaining years of his life he held the position of secretary to Professor Joseph P. Remington.

It will thus be seen that Alfred B. Taylor had an experience of nearly forty years in the retail drug business, but it was not as an apothecary that his greatest service to Pharmacy was rendered, he

having filled with marked ability many laborious and public positions. In 1848 he was appointed Inspector of Drugs for the Port of Philadelphia, and it was probably because of his interest in this department of pharmaceutical activity that he was elected the *first Secretary* of the American Pharmaceutical Association, at the initial meeting which convened in the city of New York in 1851, twelve members being present. He served the Association as secretary until 1854, and in 1890 was elevated to the highest office in the gift of the Association—that of president.

He was also the first treasurer of the Association (1852), and the second local secretary (1867).

His connection with the Philadelphia College of Pharmacy began in 1841, when he matriculated as a student, and he served in his *Alma Mater* subsequently in the following capacities: Elected a member of the College in 1848, and a member of the Board of Trustees in the same year; elected secretary of the College on May 25, 1850; serving twenty-one years in this capacity, he then became corresponding secretary, holding this office until 1886. He was thus a secretary of the College for *thirty-six* years. He also served on the Publication Committee of the AMERICAN JOURNAL OF PHARMACY for twenty-one years, beginning in 1850. In 1887 the College conferred upon him the honorary degree of Master of Pharmacy. But of all the services he rendered Pharmacy, none have been of such enduring value as those upon the Committees of Revision of the U. S. Pharmacopœia. He was a member of the Committee of Revision of the College for the Pharmacopœias for 1860, 1870, 1880 and 1890, and president of the College Committees in 1880 and 1890. Of all pharmacists he undoubtedly has to his credit the greatest number of years of uninterrupted service upon the National Committee of Revision, having acted continuously from 1860 until the time of his death, a period of *thirty-seven* years. He was the secretary of the National Committee for the 1860 and 1870 revisions of the Pharmacopœia, and during these years his position as editor and secretary required continuous and laborious duties involving critical experiments, recording and reconciling the views of the members of the Committee, and, finally, correcting the proofs and making the business arrangements for the books.

In practical pharmacy he was the first to propose the use of cacao butter as a basis for suppositories, and in 1859 he wrote a masterly

report on weights and measures, and developed in a most able manner, the value of the octonary system, with an entirely new plan for weights and measures, which will be found in the *Proceedings* of the American Pharmaceutical Association for 1859. A good mathematician, with an accurate knowledge of ancient languages, a forcible writer of English, with a correct knowledge of etymology, it will be seen that he was admirably equipped for his great work on the Committee of the Revision of the Pharmacopœia.

In the *American Journal of Pharmacy*, and in the *Proceedings of the American Pharmaceutical Association*, will be found many contributions from his pen. A review of these will exhibit his versatility.

CONTRIBUTIONS TO PHARMACEUTICAL JOURNALS, ETC.

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1850, AMERICAN JOURNAL OF PHARMACY, Vol. 22, p. 370, Reviews: "Booth's Encyclopedia of Chemistry."

1851, AMERICAN JOURNAL OF PHARMACY, Vol. 23, p. 186, "Patent Medicine Tax."

1852, AMERICAN JOURNAL OF PHARMACY, Vol. 24, pp. 34, 35, "Jackson's Syrup."

1852, AMERICAN JOURNAL OF PHARMACY, Vol. 24, p. 33, "Jackson's Lozenges."

1852, AMERICAN JOURNAL OF PHARMACY, Vol. 24, p. 33, "Castillon's Powders."

1852, AMERICAN JOURNAL OF PHARMACY, Vol. 24, p. 211, "Suppositories."

1852, AMERICAN JOURNAL OF PHARMACY, Vol. 24, p. 33, "Syrup Iodide of Zinc."

1853, AMERICAN JOURNAL OF PHARMACY, Vol. 25, p. 206, "Fluid Extract of *Serpentaria*."

1853, AMERICAN JOURNAL OF PHARMACY, Vol. 25, p. 207, "Mitchell's Aperient Pills."

1853, AMERICAN JOURNAL OF PHARMACY, Vol. 25, p. 207, "Mitchell's Aperient Powders."

1853, AMERICAN JOURNAL OF PHARMACY, Vol. 25, p. 207, "Mitchell's Tonic Pills."

1853, AMERICAN JOURNAL OF PHARMACY, Vol. 25, p. 294, "Tincture *Cinchonæ Ferratæ*."

1855, AMERICAN JOURNAL OF PHARMACY, Vol. 27, p. 407, "Cream Syrup."

1859, AMERICAN JOURNAL OF PHARMACY, Vol. 31, p. 18, "Elixir *Cinchonæ*."

1859, Proceedings American Pharmaceutical Association, Vol. 8, p. 107, "On Poisons."

1859, Proceedings American Pharmaceutical Association, Vol. 8, p. 115, "Report on Weights and Measures."

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1860, AMERICAN JOURNAL OF PHARMACY, Vol. 32, p. 97, "Weights of the Pharmacopœia."

1861, AMERICAN JOURNAL OF PHARMACY, Vol. 33, p. 202, "Report on Suppositories."

1862, AMERICAN JOURNAL OF PHARMACY, Vol. 34, p. 326, "Imperial and Wine Measures."

1863, AMERICAN JOURNAL OF PHARMACY, Vol. 35, p. 401, "Review of U. S. Pharmacopœia of 1860."

1863, Proceedings American Pharmaceutical Association, Vol. 11, p. 212, "Preservation of Volatile Oils."

1864, AMERICAN JOURNAL OF PHARMACY, Vol. 36, p. 130, "Preservation of Volatile Oils."

1864, American Pharmaceutical Association Proceedings, Vol. 12, p. 206, "Preparations of Cinchona."

1864, American Pharmaceutical Association Proceedings, Vol. 12, p. 215, "Aqueous Extract of Jalap."

1865, Numismatic and Antiquarian Society Journal, October, "Golden Relics from Chiriqui."

1865, AMERICAN JOURNAL OF PHARMACY, Vol. 37, p. 50, "Cinchona Preparations."

1865, AMERICAN JOURNAL OF PHARMACY, Vol. 37, p. 119, "Weights and Measures."

1865, AMERICAN JOURNAL OF PHARMACY, Vol. 37, p. 219, "Aqueous Extract of Jalap."

Proceedings American Pharmaceutical Association, Vol. 13, p. 156, "Uses of Glycerin."

1866, AMERICAN JOURNAL OF PHARMACY, Vol. 38, p. 325, "Glycerin Prevents Apotheme."

1866, AMERICAN JOURNAL OF PHARMACY, Vol. 38, p. 326, "Fluid Extract of Rhubarb."

1866, AMERICAN JOURNAL OF PHARMACY, Vol. 38, p. 327, "Infusum Cinchonæ Flavæ."

1866, AMERICAN JOURNAL OF PHARMACY, Vol. 38, p. 327, "Decoctum Cinchonæ Flavæ."

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1869, Proceedings A. Ph. A., Vol. 17, p. 390, "Fluid Extracts."

1870, AMERICAN JOURNAL OF PHARMACY, Vol. 42, p. 150, "Fluid Extracts" (Campbell).

1870, Proceedings A. Ph. A., Vol. 18, p. 103, "Fluid Extracts and Menstrua."

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1877, AMERICAN JOURNAL OF PHARMACY, Vol. 49, p. 273, "Changes."

1880, AMERICAN JOURNAL OF PHARMACY, Vol. 52, p. 340, "Volumetric Analysis."

1882, International Review, October, "Unification of Moneys, Weights and Measures."

1882, Proceedings American Pharmaceutical Association, Vol. 31, p. 393, "Stathmetic Estimation."

- 1883, AMERICAN JOURNAL OF PHARMACY, Vol. 55, p. 556, "Examination of Drugs."
1887, Proceedings American Pharmaceutical Association, Vol. 35, p. 599, "Weights and Measures."
1887, Philosophical Society Journal, Vol. 24, No. 126, "Octonary Numeration."
1888, Western Druggist, p. 195, "Solids by Weight, Liquids by Measure and Definite Quantities in the Pharmacopœia."
1888, Western Druggist, p. 282, "Substitute for Teaspoon," etc.
1888, Western Druggist, p. 425, "Pharmacopœial Suggestions."
1889, Western Druggist, p. 12, "Specific Gravity."
1889, Western Druggist, p. 43, "Specific Volume."
1890, Proceedings American Pharmaceutical Association, Vol. 38, p. 4, "Inaugural Address."
1890, Western Druggist, p. 15, "Decimal Quantities of the United States Pharmacopœia."
1891, Proceedings American Pharmaceutical Association, Vol. 39, p. 3, "President's Address."
1892, Western Druggist, p. 85, "Percentage Solutions."
1892, Western Druggist, p. 188, "Percentage Solutions."
1893, American Druggist, Nov. 23, "Chemical Nomenclature of the United States Pharmacopœia, 1890."

During his busy pharmaceutical life Mr. Taylor found time to cultivate his taste for outside scientific and technical pursuits, and had a great fondness for making collections of various kinds. He was a member of the Academy of Natural Sciences, one of the founders of the Philadelphia Numismatic and Antiquarian Society, and a member of the Numismatic Society of New York. He was an industrious philatelist.

Mr. Taylor married Mary A. Yeager, September 2, 1852, by whom he had five children, four of whom died in early life. One son, Joseph Y., born in 1854, entered the drug business and, following in the footsteps of his father, graduated from the Philadelphia College of Pharmacy in 1875. Alfred B. Taylor married again in 1870, but had no children by this second marriage.

In private life he was always courteous, genial and kind, strongly attached to his friends and caring little for the applause of the world, he treasured most the attachments of those who were near and dear to him. Always modest, yet holding his views with remarkable tenacity, he labored unselfishly for the attainment of the highest ideals. In whatever department of science he was engaged, he ever sought the truth.

The last few years of his life were marked by periods of great suffering. In August of 1897 his eyesight failed greatly and he was thus denied one of his chief comforts, that of reading. A long continued attack of herpes zoster rendered him very weak, and this was followed by a return of a chronic inflammation of the bladder, to which he finally succumbed, closing his eventful life on February 28, 1898, in the 75th year of his age.

Thus has passed away one of the pharmaceutical masters who has enriched the profession by faithful, unremitting devotion to its best interests, and one whose name will ever be associated with the most notable achievements of American pharmacy.

ON THE ASSAY OF BELLADONNA PLASTERS AND THE ALKALOIDAL STRENGTH OF THE BELLADONNA PLASTERS OF THE MARKET.

BY CARL E. SMITH.

Report from Research Committee D., Section II., of the Committee of Revision
of the U. S. Pharmacopœia.

The Belladonna Plasters of the American market are almost without exception prepared with a base containing rubber as the principal ingredient, combined with various resins. Moreover, they are often admittedly prepared from an extract of the rhizome of *Scopolia carniolica*, and in such cases are not "belladonna" plasters, strictly speaking. As, however, the alkaloids of this plant are practically identical with those of *Atropa belladonna* and are apparently present in more uniform quantity in it than in either the leaf or root of the latter, there would seem to be some excuse for the substitution.

METHOD OF ASSAY.

The presence of rubber necessitates some deviation from the methods of valuation, as applied to the ordinary galenical preparations of alkaloidal drugs and the most practical of the very few published methods, of which the writer has knowledge, proved to be that of S. W. Williams, Ph.C. and C. E. Parker, Ph.C., chemists for Seabury & Johnson. It is included in a comprehensive paper on belladonna plasters read before the A. Ph. A. at the meeting of 1890

(see *Proc. A. Ph. A.*, 1890, pp. 155-173; *Pharm. Record*, 1890)
At the suggestion of Prof. Virgil Coblentz, the writer called upon these gentlemen, who very kindly communicated their present process, which differs in important features from that published by them in 1890, and also offered to furnish any other assistance in their power. The writer takes much pleasure in acknowledging the valuable aid rendered to him by Mr. Williams and Mr. Parker.

The method, as obtained from the authors, has been deviated from in the writer's work only in minor details, and is in outline as follows: The plaster is cut in strips and the mass disintegrated and partially dissolved by stirring with chloroform made alkaline with ammonia water. The chloroform mixture is decanted and the cloth washed with successive small portions of chloroform. The rubber is precipitated from the chloroform with alcohol, the solution decanted and the rubber re-dissolved with chloroform and re-precipitated with alcohol repeatedly to recover any alkaloid retained in it. The alkaloid is washed out from the united alcohol-chloroform solutions with acid water, the acid solution of alkaloid made alkaline with ammonia and extracted with chloroform. After distillation of the chloroform the alkaloidal residue is titrated with acid.

This method was critically tested as to its degree of accuracy in the following manner. Extract of belladonna leaf was assayed by the "shaking out" process, 1.19 and 1.15 per cent. of alkaloid being obtained in duplicate estimations, by titration with $\frac{N}{20}$ acid. The extract was then mixed with twice its weight of a rubber combination, such as is used in the manufacture of belladonna plasters, and for which the writer is indebted to Mr. S. W. Williams. The mixture was then assayed by the above outlined method and yielded 0.393 and 0.377 per cent. of alkaloid, the amount calculated from the mean result of assaying the extract being 0.390 per cent. These estimations were made without use of heat, except in distilling the chloroform during the final stage of the process. A third determination, during which the lumps of plaster mass were heated with the alkaline chloroform on a water-bath for a considerable time, to hasten their disintegration, but otherwise conducted in the same manner, gave only 0.353 per cent.

Repeating the above experiment with extract of belladonna root, one part of an extract assaying 2.49 and 2.53 per cent. was

mixed with four parts of the rubber compound. The mass should assay 0.502 per cent.; the amount found was 0.493 and 0.500 per cent.

The incorporation of the extracts with the rubber mixture was accomplished by working them up together in the hands, pulling out, twisting, etc. This was continued until the mass had a perfectly uniform appearance. Small losses of one or the other ingredient, through adhering to the hands, were prevented by rubbing a very little petrolatum on the fingers from time to time. After admixture the mass was weighed and found to have suffered no change in weight through loss or gain of moisture. Disintegration of the mass, when in form of lumps, is very much slower than is the case with spread plasters. It was found best to drop it in small pieces *separately* into the chloroform, as otherwise the fragments reunite into one large lump, greatly retarding solution.

The above stated results indicating the method to be reasonably accurate and reliable, it was accepted as the best available for the valuation of commercial belladonna plasters containing rubber.

THE ASSAY METHOD IN DETAIL.

If the plaster to be assayed approximates the U.S.P. standard of strength, one plaster, or about 8 grammes of mass, is sufficient for each determination; if weaker, correspondingly more should be taken, if accurate results are expected. The quantities of solvents, etc., given are suitable for one plaster of ordinary size. Weigh the plaster after removing all cloth except that upon which the mass is spread, cut it into strips, and place it into a beaker of 100 c.c. capacity with 50 c.c. of chloroform and 10 drops of 10 per cent. ammonia water. Stir with a glass rod until the mass is entirely removed from the cloth, which usually requires five to ten minutes. Heating is unnecessary and is apt to cause loss of alkaloid by saponification. Decant the chloroform mixture into a beaker of similar size and add to it 40 c.c. of 91 per cent. (by weight) alcohol. Stir gently until all rubber has separated in compact form, then leave it undisturbed for a few minutes and pour off the supernatant liquid into a separator of at least 250 c.c. capacity. Wash the cloth in the first beaker with 25 c.c. of chloroform and 5 drops of ammonia water, decant the washings into the second beaker, and redissolve with them the precipitated rubber. Stir this mixture until it is perfectly free from

lumps, then precipitate the rubber by addition of 20 c.c. of alcohol and proceed as before, adding the chloroform-alcohol solution to that in the separator. Repeat this procedure once more or until all mass is removed from cloth and beaker. Dry the cloth at a low heat, cool, and weigh it. The chloroform-alcohol solution is of a light-yellowish or brownish color, the depth of color depending mainly on the proportion of extract of belladonna (or scopolia) present. If the plaster contains leaf extract, the solution is, of course, green. It is nearly always more or less turbid from minute particles of rubber held suspended, which do not settle to the bottom except upon standing for some time. This suspended matter separates out during the next stage of the process and introduces complications. Filtration is impracticable, as the filter soon becomes covered with an impervious layer of rubber. When the chloroform mixture and alcohol are shaken vigorously in a stoppered flask, instead of stirring in a beaker with a rod, the supernatant solution will, as a rule, be nearly clear, but a portion of the precipitated rubber will be in a light, flocculent condition, so that only a part of the liquid can be decanted without carrying a considerable quantity of rubber with it. The other plan was, upon the whole, considered the best, particularly as the presence of this small amount of rubber does not materially affect the accuracy of the method, but merely necessitates a little more care in the manipulation. The quantity depends to some extent on the proportion of alcohol used to precipitate the rubber from the chloroform. Although nearly all of the rubber is precipitated by a volume of alcohol one-half that of the chloroform, it was found that practically 4 volumes of alcohol are required to insure a maximum precipitation from 5 volumes of chloroform. When this proportion of alcohol is used, the rubber carried over into the next stage of the process is too small in amount to influence the result.

To the combined chloroform-alcohol solutions in the separator add 20 c.c. of water containing 2 per cent. of sulphuric or hydrochloric acid and agitate by a gentle rotatory motion and inversion of the separator during five minutes. Vigorous shaking causes emulsification. After complete separation of the liquids draw off the chloroform solution into another separator, together with any solid matter that may have separated during the agitation and collected at the line of contact of the two liquids. Pour out from the top into a third separator

or any other convenient receptacle the acid solution, which contains most of the alkaloid. Wash out the empty separator with 10 c.c. of water containing a few drops of dilute acid, draw the washings off into the second separator and agitate this as before. Draw off the chloroform-alcohol into the first separator and add the water solution to the first portion. If the contact-line of the two liquids is perfect, so as to permit a complete separation of them, only a third portion of acidulated water will be required to remove all alkaloid from the chloroform, notwithstanding the presence of a large proportion of alcohol; but if any considerable amount of solid matter collects at the line of contact, a fourth or even fifth portion will be necessary.

Make the combined acid solutions alkaline with ammonia-water and wash out the alkaloid in a separator with 3 successive portions of 20, 10, and 10 c.c. of chloroform, observing the same precautions to avoid emulsions as before. Wash the combined chloroform solutions with 10 c.c. of water to remove any adhering ammonium salts or other impurities drawn off with the chloroform, and after complete separation transfer the chloroform solution to a small flask. Agitate the water in the separator with 10 c.c. of chloroform and after separation add the latter to that in the flask.

Evaporate or distil off the chloroform. If distilled, great care must be taken that the tube and cork connecting the flask with the condenser are perfectly clean, as the estimation would be vitiated by the presence of even minute quantities of acids or alkalis. If the chloroform is to be evaporated, precautions are necessary, in view of the observations of Dieterich, that alkaloids may become partially neutralized by hydrochloric acid, which is formed through the action of the gas flame on chloroform vapors. It is advisable, therefore, not to conduct the evaporation in shallow vessels, unless it can be done through a source of heat not necessitating the use of a flame. It is considered safe, however, to evaporate on a water-bath over a gas flame, if the chloroform solution is contained in a flask having a narrow neck, and evaporation carried on rapidly by boiling.

To the alkaloidal residue add 4 c.c. of $\frac{N}{20}$ acid and agitate by rotation until all alkaloid is dissolved. This is not always easy to decide, as there is nearly always more or less of an insoluble resi-

due. This usually remains on the bottom of the flask as a semi-fluid layer, which may be brought in thorough contact with the acid by inclining the flask so that different surfaces of the residue are always exposed to the action of the acid. When the residue no longer visibly diminishes in size, agitate about 5 minutes longer, to insure perfect solution of all alkaloid. Solution should be effected in the cold, as heating with the excess of acid might partially saponify the alkaloid. Add 50 c.c. of neutral distilled water, then 0.5 c.c. of a 1 per cent. solution of hæmatoxylin in neutral alcohol, and add $\frac{N}{20}$ alkali until the color of the solution changes from yellow to a dull red. Subtract the number of cubic centimetres required from 4, multiply the remainder by 0.0145 (the $\frac{N}{20}$ factor for atropine and its isomers) and by 100, and divide the product by the net weight, in grammes, of the plaster mass taken for assay. To illustrate, a plaster weighing 12.25 grammes, with cloth, and the cloth weighing 3.55 grammes, requires 1.58 c.c. of $\frac{N}{20}$ alkali to neutralize the excess of acid, then :

$$\frac{(4 - 1.58) \times 0.0145 \times 100}{12.25 - 3.55} = 0.404 \text{ per cent. of alkaloid.}$$

The separated alkaloid is always too impure to admit of gravimetric estimation, and further purification entails too much loss for quantitative purposes. The impurities may, under certain conditions, also interfere in the volumetric estimation. If the alkaloid is dissolved with the aid of *alcohol* in the standard acid, the impurities will become diffused throughout the liquid, making a very turbid solution. Under these conditions the endreaction is not sharp. The change of color is not simply masked, as the impurities are nearly always of a light color, but, in some way not understood, they prevent a decided change of color until a considerable excess of alkali has been added. A rapid and convenient mode of dissolving the alkaloid for titration is the addition of about 0.5 c.c. of chloroform at the time of adding the standard acid. The chloroform dissolves a portion of the impurities and admits of a rapid solution of the alkaloid in the acid, at the same time leaving the acid solution practically clear. The endreaction is then quite sharp, but the red color

partially fades upon shaking, as the liberated alkaloid is taken up by the chloroform. If this is not kept in mind, the neutral point may be overstepped. The endreaction should be placed at the point where the color changes throughout the liquid, although it may disappear after further shaking or stirring.

ASSAY OF COMMERCIAL SAMPLES.

Eleven samples, comprising the products of six manufacturers, were obtained, with the double purpose of testing the general applicability of the assay method and to learn the alkaloidal strengths of the various plasters offered in the market. All prominent American manufacturers are represented, and one foreign plaster is included. The plasters were all purchased in the open market. The results given in the appended table fully corroborate previous statements to the effect that a great variation in strength exists. Only three samples in the list, all of them the products of one firm, conform to the U.S.P. standard of strength; all others are much below it.

The assay scheme, as detailed in the preceding pages, was found suitable for all plasters of American manufacture, but a modification was required for the foreign sample. That portion of it insoluble in the mixture of chloroform and alcohol could not be made to agglutinate, even on the addition of a large quantity of rubber dissolved in chloroform. The most uniform results were obtained by making the chloroform-alcohol solution up to a definite volume and filtering an aliquot part of it. In other respects no change in the method was required.

All porous plasters examined were uniform in square measure, $5 \times 7\frac{1}{2}$ inches, and in the table the average weight of the mass in one plaster is given, except in the cases of plasters put up in rolls.

| No. | Per Cent. of Alkaloid in Mass. | Weight of Mass in One Plaster, in Grammes. |
|-------------|-----------------------------------|--|
| 1. | 0.586; 0.594; 0.587; 0.571. | 8.55 |
| 2. | 0.407; 0.403; 0.400; 0.416. | 8.7 |
| 3. | 0.509; 0.497. | — |
| 4. | 0.112; 0.108. | 8.65 |
| 5. | 0.103; 0.110. | — |
| 6. | 0.060; 0.058. | 8.2 |
| 7. | 0.084; 0.081. | 7.35 |
| 8. | 0.125; 0.116. | 3.25! |
| 9. | 0.098; 0.101. | 8.35 |
| 10. | 0.042; 0.047. | 5.7 |
| 11. | 0.095; 0.093; 0.096. | — |

All samples responded readily to Vitali's test for solanaceous alkaloids except No. 11, the foreign sample, which failed to do so, probably through presence of some interfering impurity not removed by ordinary means. The alkaloid separated from it, however, showed a feeble midriatic effect on the eye of a cat in a dilution of 1 in 12,000. This plaster differs from the others also in other respects. It contains very little rubber, although stated to be "India rubber plaster." While all others are black, it is light-brown, although it is evidently made from leaf extract, judging from the presence of chlorophyll. Only one other of the number examined, No. 2, was made from the leaf extract.

As will be seen from the table, the plasters are not all spread with uniform thickness. No. 8, although containing twice as much alkaloid as No. 6 on the basis of the mass, actually contains less than the latter on the basis of square measure.

The work comprised in this paper was undertaken at the instance of Dr. Charles Rice and Dr. Virgil Coblenz, to both of whom the writer is much indebted for valuable aid and suggestions.

PHARMACEUTICAL LABORATORY OF THE NEW YORK
COLLEGE OF PHARMACY, March, 1898.

ANALYSIS OF THE RHIZOME AND ROOTLETS OF PLANTAGO MAJOR, LINNÉ.

BY J. FRANK STRAWINSKI.

Contribution from the Chemical Laboratory of the Philadelphia College of
Pharmacy, No. 175.

The results of an analysis of the leaves of this plant were published by Mr. Rosenbaum in the AMERICAN JOURNAL OF PHARMACY in 1886.

The proximate analysis of the rhizome and rootlets described herein was undertaken with the view of adding to the results of the foregoing work, and of contributing to the knowledge of the constituents of this well-known plant.

The rhizome and rootlets used in the work were collected from wild-growing plants by the writer. The two parts were carefully separated, cleaned and dried. The relative proportions of the two parts as they occur in nature are 30.5 of rhizome and 19.5 of rootlets.

It was assumed that the two parts lost the same amount of water upon drying, and they were subsequently mixed in the given proportions for the analysis. This was conducted according to Dragendorff's method.

Petroleum ether dissolved .57 per cent. of the material. The extract was of waxy consistence and had a greenish-yellow color. It was solid at ordinary temperatures, but melted on the boiling water-bath. The extract consisted of caoutchouc, wax and fatty matter. The extract was treated with hot alcohol, the clean solution filtered off and allowed to evaporate. In about a week's time, when the alcohol had evaporated, stellate groups of crystals were noticed in the semi-solid residue of fatty matter. The writer hopes to be able to further investigate these crystals in the future.

Ether extracted .41 per cent. of the rhizome and rootlets. The extract was of a dark amber color, and it only partly melted when placed on the water-bath. Warm water applied to the extract was found to have acquired a faint acid reaction. The water solution contained small quantities of glucose and a substance behaving like protocatechuic acid. Negative results were obtained for alkaloids and glucosides. That part of the extract insoluble in water was chiefly wax. This wax was insoluble in aqueous potassium hydrate solution, but soluble in alcoholic potassium hydrate solution.

Absolute alcohol was the next solvent applied. It removed 8.60 per cent. of red-brown extract. As the alcohol was being recovered from the extract a precipitate formed. This would not re-dissolve in the supernatant liquid or in absolute alcohol. But water completely dissolved the precipitate with the production of a "purple of Cassius" color. Hydrochloric acid produced no precipitate in this solution, but it caused the color to become paler. Ferric chloride imparted an olive-green color to the solution, but gave no precipitate. Sodium carbonate added to the last test produced a red color. These reactions probably indicate a phlobaphene or traces of protocatechuic acid. A fresh portion of the solution gave a yellowish precipitate with lead acetate. Glucose was found to the extent of 1.61 per cent., and, after boiling the solution with sulphuric acid, .87 per cent. of saccharose was found.

Water was put upon the residue from the treatment with absolute alcohol, but unfortunately the material underwent fermentation. For this reason the remainder of the analysis cannot be looked upon

as representative of the original material ; still, mention will be made of the proximate principles found. The water solution contained mucilaginous, but not albuminous matter precipitable by alcohol. Alkaline water also extracted mucilaginous matter.

Acidulated water dissolved pararabin substances and phosphates.

A special examination for tannin was made of some of the mixture of rhizome and rootlets by treating a portion with water, but the reactions were not sufficiently characteristic to indicate more than very slight traces of tannin, phlobaphene or allied substances.

Starch was shown to be present by both chemical and micro-chemical examinations.

The drug was found to contain 6.92 per cent. of moisture.

The ash amounted to 24.70 per cent. It was of a reddish-brown color, but a small quantity of it was soluble in water. A qualitative analysis of the ash revealed the presence of aluminum, iron, magnesium, manganese and potassium as chlorides, phosphates and sulphates.

HYGIENE OF THE TEETH.

BY CLEMENT B. LOWE, M.D.

It is related of Don Quixote de la Mancha, that after one of his battles, in which, as usual, he was defeated, he found himself lying upon the ground rubbing his bruises and bemoaning the loss of one of his molars, which had been knocked out by a large stone. He sagely remarked, after reflecting for a while on the matter, that to lose a molar was like losing an old friend. As we do not value our friends at their full worth until after we have lost them, so it is with our teeth ; and yet there has been a great improvement in the amount of care bestowed upon the teeth by the present generation.

It is stated that there has been a marked increase in the longevity of the human race during the present century, the addition to the term of life being stated at from ten to fifteen years. Various causes have been assigned for this increase, such as better dwellings, better food, increased attention to sanitation, shorter hours of labor and labor-saving machinery, a better knowledge of disease and the remedies for combatting it, all of which are probably entitled to share in the credit of the results achieved ; yet, Lauder Brunton thinks that the "credit is really due to the dentists who supply

teeth to those who otherwise would not have them, so that people can continue to masticate their food for a very much longer time than before." He gives a striking illustration of the value of mastication as follows: "I had an old pony which was beginning to show signs of decay, due, I thought, to old age. The stableman noticed that the oats were passed undigested through the pony, and he proposed that his food in future should be ground and made into a mash. This was done, and the pony at once became ten years younger and went on perfectly without further indication of age." The proper mastication of the food is one of the most important links in the chain of digestion; the lack of it one of the most fruitful causes of indigestion. Sir Andrew Clark made his patients count their bites. "The rule is, the mouth contains thirty-two teeth, so that to every mouthful of animal food you must give thirty-two bites in order that every tooth shall have a chance. If the food is at all tough, you must double the number and count sixty-four."

The proper development of the teeth in the young depends upon their receiving the proper food. This for infants is, of course, the mother's milk, which contains all of the salines necessary, providing the mother is herself properly fed. This is not always the case, and the drain of earthy phosphates may be so great in the pregnant female or nursing mother that she may complain of toothache or of her teeth dropping away, and there is a proverb which says "For every child a tooth." The administration of the syrup of calcium lacto-phosphate would be of great value in such cases. Some of our poor teeth may be directly chargeable to the character of the flour, which by fine grinding and repeated bolting has been deprived of much of its gluten and phosphates, and consists largely of fine starch. Bread of Graham flour which comprises the whole grain would be more healthful. The Scotch have shown wisdom in sticking to their oatmeal.

The eruption of the teeth is a critical period in the life of many an infant. A tooth at this time has not reached its full development, the fang has a sharp edge which, by the downward pressure of the resisting gum, presses the nerve against the bony process of the jaw-bone, making the pain suffered by these little ones far greater than is ordinarily supposed. Lancing the gums will often give instant relief, and is attended with little or no danger, provided the incision be directly down upon the tooth. The child suffers

but little pain, owing to the comparative insensibility of the gums, and will frequently allow it to be done without making any resistance. Strange to say, there is much prejudice on the part of mothers to the operation, and I have been told that if the tooth is not immediately erupted after the lancing the resulting cicatrix will be harder for the tooth to subsequently cut through. This is not the case; a cicatrix upon a mucous surface is less resistant than the original tissue. A lengthwise incision along the crown of an incisor or canine tooth is all that is necessary, but an X-shaped incision should be made for a bicuspid or a molar.

On account of their temporary character, parents often give but little care to the primary set of teeth. This is a mistake, as the character of the second set depends to a considerable extent upon that of the first. The first teeth contain more animal matter and larger pulp cavities than the permanent ones, and hence are more liable to decay. How frequently the first teeth present themselves as an unsightly, decayed row, whereas decay should be an exception and not a rule. If the teeth fall out too soon, the proper contour of the jaw may be interfered with; if they remain too long they may interfere with the eruption of the permanent teeth, causing irregularities in their alignment.

The most of people recognize the importance of cleaning the teeth daily, but many think that once is sufficient, and the best time the morning. The facts are that a quill toothpick should be used after each meal and the mouth thoroughly rinsed; a more thorough cleansing with brush and alkaline tooth powder should be given before retiring. The necessity for this care is evident if we know that the particles of food which collect between the teeth, on account of the warmth and moisture present, rapidly decay, render the breath offensive and promote the decay of the teeth. The so-called "tartar," which is largely a deposit from the saliva, also frequently does much harm, collecting principally upon the lower incisors. Candies and other forms of sugar are especially injurious if they become lodged in the crevices of the teeth, as they undergo an acid fermentation which attacks the enamel.

Tooth brushes should not be too large or too stiff, and should have the bristles projecting in different lengths. When first used it should be in an up-and-down manner, so as to remove the food remnants from the interstices of the teeth. The daily use of tooth

powders containing pumice stone, charcoal or other gritty substances will injure the enamel; charcoal should be especially condemned, as it cannot be ground into an impalpable powder, and its continuous use causes the gums to assume a tattooed appearance. Strongly alkaline soaps or tooth washes are also to be condemned. The best base for tooth powders is prepared (not precipitated) chalk; it is adhesive, gives sufficient friction and at the same time acts as an antacid. We generally add some powdered orris-root, which has a pleasant flavor and a favorable effect upon the gums. The addition of any considerable quantity of astringent, such as alum, krameria or cinchona, is not wise unless there be a marked vascularity of the gums. In conditions needing an astringent tooth wash, Dr. Jas. W. White suggests the use of equal quantities of tincture of krameria and eau de cologne. He thinks the use of the old standby, tincture of myrrh, of questionable value, as by its dilution the resin is deposited about the necks of the teeth, aggravating, rather than alleviating, the spongy conditions of the margins of the gums. He also suggests an excellent mouth wash for spongy and bleeding gums, viz.: Tannin, 1 drachm; potassium chlorate, 2 drachms; boiling water, 2 pints. In case acids have to be taken as a medicine, they should be largely diluted and taken through a glass tube, and the teeth afterwards brushed with tooth powder or with a solution of soda or magnesia. In case the gums recede a little, acids do special harm, as they attack the dentine below the enamel.

An aching tooth should never be extracted if possible to save it by treatment and filling, because not only is the tooth lost, but the opposing tooth in the other jaw loses its antagonist and has nothing to grind against, and may, therefore, rise beyond the line of the adjacent teeth; the pressure produced during mastication seems to be essential to the retention of the teeth in their natural positions. It is a wise thing, therefore, to frequently give a child a crust of bread to exercise its teeth upon, notwithstanding soft food may agree with it.

The proper material for filling teeth must be left to the dentist's discretion and the state of our pocket-books; it can be said, however, that generally the best material is gold. Few would be so foolish as the lady of fashion who had two small holes drilled in her upper incisors and diamonds inserted.

Various dental anodynes are in use, the principal ones being tincture of opium, oil of cloves, carbolic acid and cocaine; they all act by depressing the peripheral terminations of the sensory nerves, opium in addition impairing their conductivity. Carbolic acid and cocaine have also a local anesthetic effect. A caution should be given about the free use of cocaine, as various untoward effects depending upon some peculiar individual idiosyncrasy have been numerous of late. The drug in small doses is generally a heart stimulant, but sometimes acts as a heart depressant. *Piscidia erythrina* (Jamaica dogwood) in the shape of a saturated tincture is said to be also an excellent anodyne, it can also be given internally for its hypnotic effects. Experiments regarding it are desirable.

Dangerous hemorrhage after the extraction of a tooth is not frequent. In several cases I have been successful after others had failed, by the application upon moistened absorbent cotton of powdered subsulphate of iron (Monsel's salt) with continuous pressure. Sometimes the cavity is so great that there is no way of packing the cotton, in such a case pressure can be maintained by a piece of cork placed so that the opposing teeth rest upon it, the jaws being afterwards tightly bandaged. Monsel's solution is not so good a preparation as the salt. In a case that came to my notice, the solution was sold by a pharmacist with a caution as to its use; the caution was not regarded, and the customer's mouth and tongue were badly constricted and blackened. An angry interview, in which considerable damages were demanded, followed. A quietus was put on this by the pharmacist, who announced \$1,000 for defense, but not one cent for damages, but he lost a customer whose long tongue did him all the damage possible.

FORMALDEHYDE.

BY GEORGE L. TAYLOR.

Known also as formic aldehyde, formal, formalin, etc., is the gaseous oxidation product of wood alcohol. At a temperature of 20° C. this gas polymerises and by the reunion of two of its molecules forms para-formaldehyde; a white semi-solid body of a soapy consistency, soluble in water or alcohol.

An aqueous solution of this para-formaldehyde forms in part the commercial article. Another commercial product, trioxymethylene,

formed by the reunion of three molecules of formic aldehyde, is the base of the solid product used in the form of pastilles, or in powdered form as a disinfectant.

Preparation of Formaldehyde.—The process of the discoverer, Hoffman, consisted of passing the vapor of methyl alcohol, mixed with a certain proportion of air, through a tube of platinum heated to dull redness. The resulting gases were condensed in a flask, and in addition to the methyl alcohol, small quantities of formic aldehyde were obtained.

Various modifications of Hoffman's process were brought out by other investigators, but all experienced great difficulty in obtaining the final product in any considerable quantity, and all found that the results might be rendered null by the most minute variation of any one of the factors employed.

The principal difficulties encountered, were, first, the great danger of explosion caused by bringing the vapors of methyl alcohol in contact with incandescent metal. These explosions sometimes occurred in the oxidizing tube and sometimes in the tank containing the alcohol. A second obstacle was the difficulty of oxidizing a large amount of alcohol at one time.

The whole process of oxidation must be very carefully conducted and the proportion of air and methyl vapor admitted to contact with the incandescent material must be very carefully adjusted, as, if oxygen is not present in sufficient quantity, no change takes place, and the product obtained is methyl alcohol, and, if oxygen is in excess, the process is carried too far, and formic acid or carbonic acid is produced.

In an apparatus which I have designed for producing formaldehyde in commercial quantities, the methyl alcohol to be converted is contained in a circular steel tank, capable of resisting heavy pressures; in the bottom of this tank is placed a coil of copper pipe into which steam at a high temperature is admitted; by this means the alcohol in the tank is boiled, and the resulting vapor is confined until a pressure of 75 or 80 pounds is reached, when it is allowed to escape into an air-mixer. This mixer is so constructed that an exactly determined quantity of air can be intimately combined with the methyl vapors. From the mixer the combination of air and vapor passes with great force and velocity through a fine tube into the converter, which has been brought to a dull red heat.

This converter consists of two concentric copper tubes, the space between which is filled with broken coke or other material of a similar nature. The inner tube is finely perforated with many small holes. The alcohol vapor is admitted into this inner tube, and, escaping through the perforations, is oxidized by coming in contact with the heated coke and the copper surface of the outer tube.

The gases produced in the converter pass over into the condenser. This condenser consists of a cylindrical tank or receiver, which may be of copper; it contains a coil of copper pipe, through which circulates a refrigerating mixture capable of reducing the temperature in the tank to about 0°C. , at which temperature formic aldehyde condenses into a clear, very mobile liquid, which boils at 21°C. , and which polymerises at 20°C.

After undergoing certain processes of purification, enough water is added to form a 40 per cent. solution.

This solution is not, strictly speaking, a solution of formaldehyde, but of para-formaldehyde, as the pure formaldehyde polymerises the moment the temperature rises above 20° . It is this property which renders the addition of water or alcohol necessary.

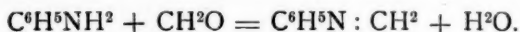
Formaldehyde Pastilles.—Paraformaldehyde, dried in the presence of sulphuric acid, becomes less soluble in water. The insoluble part constitutes trioxymethylene, a white powder resolving by heat into pure formic aldehyde. This powder is pressed into pastilles and in that form used as an antiseptic and deodorant.

Analysis of Formaldehyde.—(1) To detect its presence. Trillat's method. An aqueous solution of aniline is obtained by dissolving 3 grammes of fuchsin or magenta in 1 litre of distilled water; mix in a test tube 20 c.c. of this solution with 20 c.c. of the liquid to be assayed. In the presence of formic aldehyde a very light cloud forms after several hours. This reaction is very delicate; by it formaldehyde can be detected in a solution of $\frac{1}{20000}$. In solutions of this attenuation, however, the reaction does not appear until after the lapse of several days.

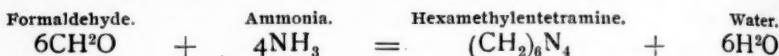
The search for formaldehyde in alimentary substances is often futile, because it forms, with certain organic substances, combinations from which it cannot be separated.

Quantitative Analysis.—To a solution of 3 grammes of aniline in 1 litre of water is added, drop by drop, thoroughly shaking, from

1 to 4 c.c. of the solution to be tested, according to the presumed concentration. It forms a white cloud, which is finally precipitated. After forty-eight hours the liquid is passed through filter paper, the precipitate is dried at 40° C., and its weight determined. The corresponding quantity of formaldehyde will be given by equation.



The method employed by Dr. Laderle, Chief Chemist of the New York City Health Department, is based on the principle that ammonia and formaldehyde combine readily to form the compound hexamethylentetramine, according to the following reaction:



From the amount of ammonia required to form this compound formaldehyde is calculated. An excess of ammonia should be used and the mixture allowed to stand for at least twelve hours; the excess of ammonia present is determined by means of sulphuric acid.

Method of Analysis.—Take specific gravity of the solution at room temperature.

Place 2 or 3 c.c., carefully measured, into a bottle with glass stopper; add 50 to 60 c.c. $\frac{\text{N}}{2}$ ammonia solution; shake well and let stand twelve hours, shaking occasionally. Then titrate with $\frac{\text{N}}{4}$ sulphuric acid, using coralline as indicator.

Calculation—c.c. of ammonia neutralized by formaldehyde equal c.c. of ammonia used, minus c.c. of sulphuric acid.

Then, per cent. strength of solution equal

$$\frac{2.25 \times \text{c.c. ammonia neutralized by formaldehyde}}{\text{Grammes solution taken.}}$$

Uses of Formaldehyde.—Formaldehyde has been put to an almost endless number of uses in the arts and sciences, but it is its great value as a disinfectant and deodorizer that has brought it into such general notice. Early in its history it was noted that it possessed strong germicidal and preservative powers, and many forms of apparatus were designed in the attempt to render it available for the purposes of household disinfection. This would seem to be a very

simple problem, but in practice many difficulties were encountered; it was at first thought that it would only be necessary to evaporate a quantity of the solution in an open vessel placed over a heating-lamp in the room, but it was found that when the solution became concentrated by boiling, polymerisation occurred and paraldehyde was formed, thus rendering about 70 per cent. of the formaldehyde in the solution inert and unavailable. The same result ensued when formaldehyde was evaporated at room temperature.

Trillat demonstrated that when the temperature was raised to a point considerably above that of boiling water, all of the gas in the solution was given off and rendered available for disinfection. His apparatus consisted of a strongly-constructed autoclave made of copper and provided with a heating-lamp, pressure gauge and releasing valve. In operation the solution of formaldehyde was heated in the autoclave until a pressure of three atmospheres was attained, when the releasing valve was cautiously opened and the generated gas was conveyed by a small tube through the keyhole into the apartment. Satisfactory results were obtained with this apparatus, but its great weight, the length of time required for each disinfection, and its first cost and the expense of operation have prohibited its use in many large cities when a number of disinfections are made daily. Many lamps designed to generate formaldehyde directly from methyl alcohol have been brought out from time to time, but, owing to the extreme delicacy of adjustment required, and also to the fact that varying atmospheric conditions render constant changes in adjustment necessary, none have given satisfactory results or have succeeded uniformly in generating more than a very small percentage of formaldehyde.

About two years ago I was requested to design a small portable apparatus for house disinfection. The requirements were that it was to be inexpensive in first cost and in operation, and that it should be so simple in construction and operation that it could be readily understood by a person of average intelligence. After a number of partial failures, I have succeeded in designing this apparatus, which I think fills the requirements.

It consists of a copper reservoir capable of holding sufficient formaldehyde to effect ten or twelve disinfections; beneath this receiver, and connected with it by a tube, is a copper evaporating chamber; under this chamber is a powerful heating-lamp. In operation, the

lamp is lighted and this evaporating chamber is brought to a red heat, a valve controlling the opening of the tube from the receiver to the evaporating chamber is opened and the formaldehyde solution is allowed to trickle down in a fine stream into the heated chamber. It is then instantly vaporized, the intense heat breaks up the polymerised products, and the pure gas is delivered through the delivery-tube and is conducted into the apartment.

Dr. W. H. Park and Dr. Arthur R. Guerard made a long series of bacteriological tests to determine the apparatus best adapted for the use of the New York City Health Department.

These tests were very thorough and comprehensive; they proved that formaldehyde could be depended upon to produce thorough surface disinfection; that its use did not affect colors or metals in any way, and that the cost of disinfection was not greater than when sulphur was used.

In their published reports, many investigators have stated that they are unable to get satisfactory sterilization with formaldehyde. I have investigated many of these cases and in nearly every instance have found that the failure was not due to the lack of germicidal power in the gas, but because too much had been expected of it, and because the test organisms had not been freely exposed; one might think that a culture placed in an open test tube was freely exposed, but this has proved to be an extremely severe condition, as the gas is required to replace a closed pocket or cushion of air. The same objection can be held against the practice of exposing cultures in boxes with perforated sides or covers. Other experimenters have wrapped the cultures in filter paper, a substance which is practically impenetrable by the gas.

The method which has been generally adopted as being the most satisfactory and as giving the most uniform results is as follows:

Loosely twisted threads of cotton are steeped in virulent cultures of pathogenic, non-spore-bearing bacteria. These threads are dried and half of each thread is cut off and reserved as a check on the result. The other half is placed on a strip of sterilized paper and freely exposed for six hours to the action of the gas generated from six ounces of formaldehyde solution. The threads are then placed in tubes containing the medium best adapted for the growth of the organisms employed and kept in an incubator for from 46 to 70 hours. If, at the end of that time, a growth of the specified bacteria

employed cannot be detected, sterilization is presumed to be complete.

GRAY'S GLYCERIN TONIC COMPOUND.

BY WILLIAM L. CLIFFE.

A preparation under the above title has recently been offered for sale in Philadelphia by a firm of New York office pharmacists. They claim proprietorship for it by a process peculiar to merchants of their class. It seems to the writer that it would be as proper for their enterprise to lay claim to the ownership of Huxham's Tincture or Jackson's Pectoral Syrup; they would be just about as able to prove their title. Gray's Glycerin Tonic Compound has been a regular article of stock among Boston pharmacists for years, and is very commonly prescribed. The original formula, as appended, was furnished by the well-known firm of Boston, Kelley & Durkee, several years ago, when a prescription for it, written in Boston, was presented to the writer for compounding:

| | |
|---|--------------------------------------|
| Gentian root, No. 40 | 3¼ ounces Troy. |
| Sherry wine, q. s. to percolate | 26 fluid ounces. |
| To percolate add: | |
| Extract of dandelion | 4¾ ounces Troy. |
| Glycerin | 26 fluid ounces. |
| Dilute phosphoric acid | 4¾ fluid ounces. |
| Tincture of cardamon compound | } of each 6½ fluid ounces. |
| Syrup of lemon | |
| Syrup of orange peel | |

GLEANINGS FROM THE MEDICAL JOURNALS.

BY CLEMENT B. LOWE, M.D.

The following article is especially commended to the attention of the younger members of the pharmaceutical profession who in the exuberance of their spirits are frequently tempted to do likewise.

SELLING MEDICINE FOR TRICK PURPOSES AN ASSAULT AND BATTERY.

A conviction of assault and battery, in the case of *State vs. Monroe*, of most peculiar character, was affirmed by the Supreme Court of North Carolina, December 21, 1897. An individual, Will Horn, had administered to one Ernest Barrett a dose of croton oil, and the oil had an injurious effect upon Barrett. This led to the prosecution of the defendant, Monroe, for assault and battery. Mon-

roe admitted that he sold the oil to Horn, and at his request dropped it into a piece of candy, but denied that he knew that these parties were playing practical jokes on each other, and denied knowing for what purpose Horn wanted the oil. His guilt as a principal, not as an accessory, the court held, depended upon whether he knew, or had reason to believe, that the dose was intended for Barrett or some other person as a trick, and not for medicinal purposes. Upon the whole evidence he was found guilty. The instruction given to the jury that if the defendant knew or had reason to believe, and did believe, when he sold the oil, that it was intended for Barrett or some other person as a trick or joke, and not for medicinal purpose, the defendant would be guilty of assault and battery, also that it was not necessary that it should be a poisonous or deadly dose; but that it was sufficient if it was an unusual dose, likely to produce serious injury, the Supreme Court pronounces unobjectionable in point of law.—*The Jour. Amer. Med. Ass.*, February 26, 1898.

FOR IRRITABLE BLADDER.

R. Salol, ʒij
Tinct. hyoscyami, ʒij
Inf. buchu, q.s. ad. ʒvi

℞.—Sig.: One tablespoonful three times a day.—*N. Y. Med. News*, February 26, 1898.

SOME OF THE DANGERS SURROUNDING THE DAIRY.

The above is the title of an interesting paper by Dr. E. F. Brush, of Mt. Vernon, N. Y. He says: "Few people realize the menace which lies in the milk-supply of cities. Milk which is dangerous, and perhaps deadly poisonous, appears just as innocent, innocuous, and deliciously nourishing as the fluid that is so in truth.

* * * * *

"We are constantly searching for a specific remedy for scarlet fever and other often fatal diseases of childhood, while frequently permitting the bacterial cause of disease to be fed to our children in their milk.

* * * * *

"In these days of bottled milk the danger of spreading contagion is vastly increased. Bottles which go into rooms where children are suffering from any of the contagious diseases must be a source

of danger if not subsequently sterilized. Quite recently I had occasion to visit a man who did a large bottled-milk business in New York City. The milk came in wagons from the upper part of Westchester County, and he had a horse-stable half way between his source of supply and New York. Here his horses were changed. All the milk came to this stable in cans, and the empty bottles came back here to be washed. He had two wooden troughs in this stable, and a stove with a large kettle to heat water, and the bottles were washed here in lukewarm water with sal soda, rinsed with cold water, and then filled from the cans.

"I think, if some of us had followed these bottles around and had seen where some of them had been, we would have wanted them pretty well steamed and sterilized before we drank from them."—*N. Y. Med. News*, February 12, 1897.

TREATMENT OF ENURESIS.

Martin (*The Med. Press and Circular*, December 15, 1897) gave a boy, aged seven years, who for some months had been in the habit of wetting his bed three or four times each night, the following mixture:

| | |
|--------------------------------|-----|
| R. Potass. bromid., | 3ij |
| Tinct. belladonnæ, | 3ij |
| Tinct. chloroformi co. (B.P.), | 3i |
| Aq. ad., | 3vi |

M.—Sig.: 3ss at 4 P.M. and a second dose at bedtime.

From the time when this was first administered there was no occurrence of the enuresis.

THE DEATH-RATE FROM TYPHOID FEVER.

In the last twenty years the typhoid death-rate in Germany has declined in successive five-year periods, per 10,000 living, in the following ratios: 6.17, 4.99, 2.78 and 1.86. During a similar period the typhoid death-rate of Philadelphia has not been reduced by one-half. In 1880 it was 58.7 per 100,000, and in 1896 it was 38.81. During thirty-six years ending December 31, 1896, the total number of deaths from typhoid reported in Philadelphia was 19,663. In 1892 the ratio of typhoid mortality to the general mortality was: in Philadelphia, 2.22; in Chicago, 2.64; in Boston, 1.22; in London, .49, and in Berlin, .42. We pay high prices for our "liberty and equality"—i. e., for our bosses and our slavery.—*The Phila. Med. Jour.*, February 5, 1898.

AN OINTMENT FOR ENLARGED GLANDS.

R. Ichthyol, }
 Ung. hydrarg., } āā 3i
 Ung. bellad., }
 Ung. petrolati, 3ss

℞. Ft. ung.—Sig.: Apply night and morning over the affected glands, using friction until absorbed.—*N. Y. Med. News*, February 19, 1898.

FOR ERYSIPELAS.

The intense burning pain is said to be relieved and the progress of the disease favorably influenced by the use of the following application:

R. Aristol., gr. xx
 Collodii, 3i

℞.—Sig.: Apply freely with a camel's-hair brush over and slightly beyond the inflamed area. This should be renewed as it scales off.—*N. Y. Med. News*, February 19, 1898.

AN ABUSE OF MEDICAL CHARITY.

Last winter a man presented himself at the New York Ophthalmic Hospital and asked that an operation for cataract be performed, stating that he was very poor. The hospital is partly supported by charity. In view of the man's statement that he was unable to pay much, the physician in charge reduced the usual \$15 per week to \$5 per week for board and attendance. The man was admitted and stayed several weeks. It was then learned that he was senior member of a large grocery firm and was worth about \$150,000. The hospital, therefore, presented a bill for \$200, the full rates; the man refused to pay; the hospital sued, and received a verdict for the amount. Such vigorous treatment applied to a few of the many similar cases constantly recurring would have a beneficent effect upon the community.—*Annals of Ophthalmology*.

A VAGINAL ANTISEPTIC AND ASTRINGENT.

The Journal de Médecine de Paris for January 30th attributes the following formula to Lutaud:

R Alum, }
 Boric acid, } each, 900 grains.
 Carbolic acid, }
 Oil of wintergreen, } each, 20 drops.

℞.—A teaspoonful to be dissolved in a pint of hot water for a vaginal injection.

PILLS FOR NEURASTHENIA.

| | |
|------------------------|------------|
| R. Iron lac tate, | 2 drachms. |
| Iron arseniate, | 3 grains. |
| Extract of nux vom'ca, | 7 " |
| Extract of gentian, | 45 " |

M.—Divide into a hundred pills. Two to be taken with each meal.—*Journal de Médecine de Paris.*

PROGRESS IN FORMALDEHYDE DISINFECTION.

For two years the Chicago Health Department has been investigating the claims made for formaldehyde as a disinfectant, with special reference to the practicability and value of its use for household or domestic disinfection. Every known form of formaldehyde disinfection has been tested during this period.

Under Dr. Gehrmann's supervision a simplified form of apparatus has been constructed, in which is used formalin diluted by the addition of three times its volume of water. The apparatus consists of a shallow granite-ware vessel, of half-gallon capacity, supported over a methyl-alcohol lamp capable of holding twelve to sixteen ounces of the wood spirits.

One pound of the formalin solution (40 per cent. of formaldehyde) contains approximately 200 grammes of formaldehyde, and, as from 30 to 50 grammes are sufficient for the disinfection of 1,000 cubic feet of space, one pound of the solution should be sufficient for the treatment of 4,000 cubic feet of space, providing all the formaldehyde can be vaporized. In practice the experiments thus far conducted show that by diluting the ordinary solution with three times its volume of hot water, and then boiling for half an hour, from 40 to 50 grammes of the gas will be disengaged, quite sufficient to disinfect 1,000 cubic feet of space.

The results have, indeed, been so satisfactory and the remarkable bactericidal properties of formaldehyde have received confirmation in such a practical manner through these experiments, that an inexpensive vaporizer (costing less than twenty cents) has been devised by Dr. Jaques, chief of the diphtheria corps, for use in the room occupied by a diphtheria patient during the case. This is furnished and used in all charity cases of diphtheria treated exclusively by the department.—*Journal American Medical Association*, February 19, 1898.

FOR PERTUSSIS.

| | |
|-------------------------|----------|
| R. Tr. belladonna, | ℥ ss |
| Phenacetin, | gr. lxxv |
| Spiritus frumenti, | ℥ iv |
| Extract. castaneæ fld., | ℥ ii |

℞.—Sig.: To a child over one year of age administer ten drops every two to six hours; for a child of ten years the dose is one teaspoonful.—*New York Medical News*, February 19, 1898.

RECENT LITERATURE RELATING TO PHARMACY.

THE VOLATILE CONSTITUENTS OF THE WOOD OF *GOUPIA TOMENTOSA*.

W. R. Dunstan and T. A. Henry (*Proceedings of the Chemical Society*, London, March, 1898), state that *Goupia tomentosa* is a large tree growing in British Guiana, where it is known as "kabucalli." The wood is hard, and is used in the colony for boat-building. When freshly cut it emits a smell resembling that of valerian. By distilling the wood with water, a mixture of acids of the acetic series was obtained, from which the authors have isolated and identified formic acid, isovaleric acid, normal capric acid and lauric acid. A small quantity of succinic acid was also obtained.

SOLUBLE STARCH.

According to Wiktor Syniewski (*Ber.*, 1897, **30**, 2415-2418) soluble starch may be obtained by the action of a 9 per cent. solution of sodium peroxide on potato starch suspended in water, and is purified by repeated precipitation by alcohol, when it forms a snow-white amorphous substance which is almost free from ash; this has the composition $3C_6H_{10}O_5 + H_2O$, is soluble to the extent of 12.5 per cent. in cold water, and in all proportions in hot water; the aqueous solution is not altered by warming on the water-bath, and is colored a pure blue by iodine. The compound is dextrorotatory, but the specific rotation increases with the concentration of the solution. The yield is about 90 per cent. of the original material, the loss being purely mechanical.—*Journal of the Chemical Society*, London, February, 1898.

SOLUBLE STARCH AND DIASTASE.

In an investigation on the chemical constitution of diastase and the determination of its activity on soluble starch, A. Wroblewski has obtained results showing that in all preparations of diastase the

greater part of it consists of the inactive body arabin, and that diastase is a protein substance more resembling albumose than any other known proteid. Soluble starch can be prepared from starch either by boiling with water or with 2 per cent. potash solution; in the latter case acidulating and precipitating with 95 per cent. alcohol. Starch treated in this manner gave 50 to 60 per cent. of snow-white soluble starch, which dissolves to the extent of 3 per cent. in cold water, but is almost insoluble in 40 per cent. alcohol. Soluble starch is no doubt none other than the first product in the hydrolysis of starch. The action of alkalies on starch is similar to that of diastase, and alkalies, if slower, have greater hydrolytic power.—Hoppe Seyler, *Zeits. Physiol. Chem.*, xxiv., 174, through *Pharmaceutical Journal*, February 19, 1898.

PHYSIOLOGICAL ACTION OF TANNIN AND GALLIC ACID.

Erich Harnack (*Zeit. Physiol. Chem.*, 1897, **24**, 115-124) reports that by administering to men or dogs small medicinal doses of tannin or gallic acid, the quantity of gallic acid in the urine is very small, but the greater amount is contained in the *fæces*. It is probable that some of the gallic acid which passes into the urine is decomposed, and traces of pyrogallol are found, if, in searching for it, the acidified urine has been evaporated; if the evaporation is omitted, pyrogallol is never found. Pyrogallol is highly poisonous, and is not formed in the organism.

On giving larger doses of gallic acid, more passes into the urine, especially if alkalies are given as well.

By feeding on free tannin none passes into the urine, but it is found after giving a freshly-prepared solution of tannin in alkali. For the isolation of tannin, the salting-out method by saturated sodium-chloride solution, and precipitation by solution of gelatin or albumin free from globulin, is recommended. The separation of small quantities of pyrogallol and gallic acid is only possible when the solubility of the former in boiling benzene is made use of.—*Journal of the Chemical Society*, London, February, 1898.

PREPARATION OF SOLUBLE STARCH AND STARCH SOLUTION.

Otto Foerster (*Chem. Zeit.*, 1897, **21**, 41) states that to prepare soluble starch a paste of 20 to 25 grammes of starch with water is poured in a thin stream into 200 to 300 c.c. of hot water containing

5 c.c. of concentrated hydrochloric acid, the liquid being stirred until it becomes homogeneous and fairly fluid; heat is then applied and the stirring continued until the liquid is clear and limpid as water. After cooling it is filtered, alcohol added to the filtrate, the precipitate which is formed washed with alcohol until free from chlorine, then with ether, allowed to dry in the air, and finally dried by gently warming, or, better, by allowing it to remain over sulphuric acid. To prepare a solution of starch, 20 grammes are dissolved as described above, the hydrochloric acid being carefully measured so that it may afterwards be exactly neutralized. The volume of the neutral filtered solution is made up to a litre by adding glycerol. The excess of water can be evaporated after the addition of the glycerol, whereby the stability of the solution is perhaps increased. Both these preparations give blue colorations with iodine.—*Journal of the Chemical Society*, London, February, 1898.

PERU BALSAM.

K. Dietrich has obtained authentic samples of Peru balsam from Honduras, which represent the pure natural product of the trees. The author distinguishes three qualities of the product, representing the first, second and third flow respectively, mixed with a few traces of bark. The three varieties differ from the commercial products by being much thicker, also much clearer and of darker color, and having a more intense balsamic odor. The author contradicts the usual supposition that the same tree furnishes balsam of the same quality, since the three samples examined showed different ester numbers. The balsams examined furnished 77 per cent. of aromatic bodies (cinnamein, etc.) and only 13 per cent. of resin ester, while the commercial products never have more than 65 to 75 per cent. aromatic substances. The proportion of cinnamein differs to the same extent, and the residue insoluble in ether was found to be 41.38 per cent., or 1.5 to 3 per cent. more than those of the commercial products. On this basis a balsam having less than 65 per cent. of aromatic substances and more than 28 per cent. of resinous matter should be considered as doubtful quality.—*Berichte d. Pharm. Ges.*, 1897, 437, through *Pharmaceutical Journal*, February 26, 1898.

DAVIESIA LATIFOLIA.

In a communication to the *Pharmaceutical Journal* in its issue of February 26th, Mr. J. Bosisto directs attention to this plant as

one worthy of investigation, and mentions that, in the districts where it abounds, its infusion has proved useful in the treatment of hydatids, low fevers, etc.

The plant is indigenous to Victoria, Australia, and belongs to the natural order Leguminosæ, suborder Papilionaceæ. It is a low-growing shrub, and is also known as the "Native Hop Bush," probably on account of its bitter taste.

The author states that a crystalline principle may be obtained by making an infusion of the leaves (and flowers when in season), concentrating to about one-half, and setting aside for crystallization to take place. After separation of the crystals, of which a further crop may be obtained by slight evaporation of the liquid, an oleo-resin having a bitter taste remains.

A small amount of the crystalline principle was examined by Messrs. Paul and Cownley,¹ who report on it as follows:

"It was a bitter, neutral substance, readily soluble in hot water, crystallizing out on cooling in the form of fine white needles, which were rendered anhydrous at 100–120° C. It was insoluble in ether, soluble in boiling chloroform and readily dissolved by weak alcohol, from which it was left as an amorphous residue on evaporation, but soon crystallized on the addition of a little water. It was soluble in caustic soda, and reprecipitated apparently unchanged by acids. On purification of the original crystals by recrystallization from water, the substance still retained its bitter taste and had a constant melting-point after having been dried at 120°. Fusion with sodium gave no indication of nitrogen. It did not reduce Fehling's solution until after hydrolysis by boiling with acid. Its aqueous solution was precipitated by ammoniacal lead acetate, but not by neutral lead acetate."

As stated by Messrs. Paul and Cownley, these results point to this substance as being either a glucoside or sugar, but unless the persistent bitter taste could be eliminated by further purification, they are in favor of the former view.

These investigators hope to continue their study of the constituents of *Daviesia latifolia* when they obtain the leaves in sufficient quantity for the satisfactory extraction of them.

HYDROCINCHONINE.

Dr. Hesse has been further investigating hydrocinchonine, which was first obtained by Caventou and Willm by oxidation of commer-

¹ *Pharmaceutical Journal*, February 26, 1898.

cial cinchonine sulphate with potassium permanganate. It has already been pointed out that hydrocinchonine naturally exists with cinchonine, and can be separated from it in several ways, whilst the cinchonine of *Remijia purdieana* has been found by Dr. Hesse to contain it in relatively larger quantity. The two mixed bases are best separated by converting them into platinum salts in a very slightly acid solution, so that the excess of hydrochloric acid does not exceed $\frac{1}{4}$ molecule of HCl, and removing the flocculent hydrocinchonine salt from the granular platinum salt of cinchonine. Hydrocinchonine was then obtained by treating the platinum salt with ammonia and recrystallizing from hot alcohol.

Hydrocinchonine melts at 268° to 269° C., and has a rotatory power of $[\alpha]_D = +204.5^{\circ}$ in absolute alcohol at 15° C. The sulphate $(C_{19}H_{24}N_2O)_2H_2SO_4 \cdot 12H_2O$, and sulphates containing 9, 6 or 2 molecules of water have been obtained. They all lose the water of crystallization at 100° to 120° C. Hydrocinchonine sulphonic acid, $C_{19}H_{23}N_2O \cdot SO_3H \cdot H_2O$, was obtained by dissolving hydrocinchonine in sulphuric acid (1.84 specific gravity), allowing to stand forty-eight hours, adding water, and nearly neutralizing with ammonia. The greater part of the sulphonic acid separates out, and can be recrystallized from boiling water. Dr. Hesse differs in several instances from Skraup's work on hydrocinchonine, and also objects to Skraup substituting the name "cinchotine" for that body.—*Annalen*, 300, 42, through *Pharmaceutical Journal*, February 26, 1898.

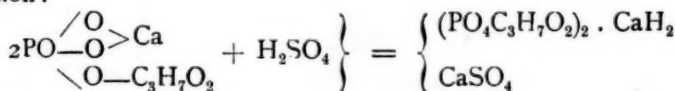
ALKALOIDS OF LYCORIS RADIATA.

Morishima has isolated two alkaloids from *Lycoris radiata*—lycorine, precipitated by sodium carbonate from sulphuric-acid solution, and sekisanine. Lycorine, $C_{32}H_{32}N_2O_8$, forms large, colorless, polyhedric crystals, which turn yellow at 235° C., and decompose at 250° C. to a deep-brown resinous mass; they are barely soluble in water, sparingly so in ether, alcohol and chloroform. The solutions in acids give precipitates with the usual alkaloidal reagents. The gold salt is easily decomposed, and the platinum salt melts at 210° . $K_2Mn_2O_8$, in neutral solution, furnishes a brown precipitate, which is dissolved with a fine fluorescence by an excess of hydrochloric acid. The fluorescence is also produced by dilute bromine water. The hydrochloride, $C_{32}H_{32}N_2O_8 \cdot 2HCl + 2H_2O$, crystallized from hot water in colorless, bitter, shining needles, melting at

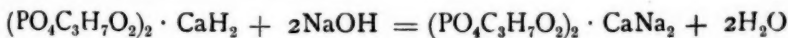
208° C. It produces general paralysis on frogs, and death through paralysis of the heart muscles; on warm-blooded animals it gives rise to vomiting, diarrhoea, and, finally, collapse. No special influence is apparent on the arterial or respiratory organs. Subcutaneous injections produce no irritation. Sekisanine, $C_{34}H_{36}N_2O_9$, or $C_{34}H_{36}N_2O_9$, crystallizes from dilute alcohol in long, colorless, anhydrous columns, which are odorless and tasteless, melting at about 200° C. It is scarcely soluble in boiling water, sparingly in ether, chloroform and benzol, readily in alcohol. It is only partially precipitated from acid solutions by sodium carbonate and alkaline solutions, being soluble in excess of the latter. The platinum salt melts at 194° C. It gives no precipitates with the usual alkaloid reagents, and no fluorescence with bromine water, or $K_2Mn_2O_8$. Crystallized salts could not be obtained. Physiologically it is quite inactive.—*Chem. Zeit. Rept.*, xxii, 13, through *Pharmaceutical Journal*, February 26, 1898.

ASSAY OF GLYCEROPHOSPHATES.

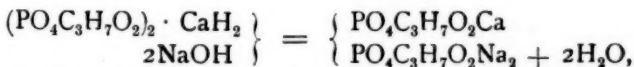
A. Astruc has confirmed the view that calcium glycerophosphates in solution are alkaline to methyl-orange, and that they may be either acid or alkaline to phenolphthalein. To determine the amount of phosphoric acid present, he neutralizes a known volume of glycerophosphate solution with sulphuric or hydrochloric acid, with methyl-orange as indicator, then titrates the solution with standard alkali and phenolphthalein. In the equation representing the first reaction:



one molecule of mineral acid corresponds to two molecules of phosphoric acid, and in the second



or,

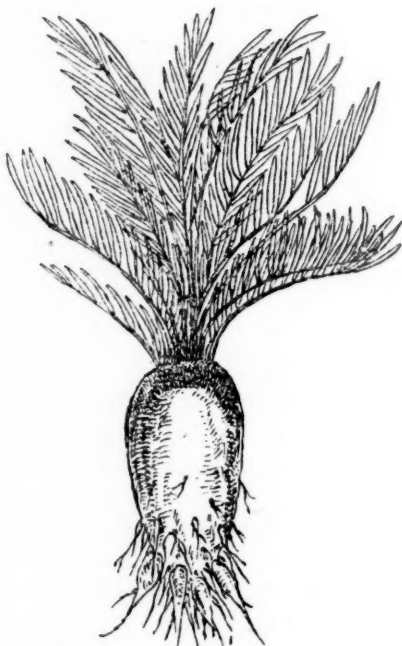


one molecule of phosphoric anhydride corresponds to two molecules of soda. The quantity of phosphorus pentoxide in solution can thus be calculated, the results obtained being about 0.5 per cent. lower than those obtained by calcining a known weight of glycerophosphate.

phosphate, dissolving the ash in hydrochloric acid, and determining the phosphorus as magnesium pyrophosphate. The author concludes that the phosphoric acid in glycerophosphates can be determined very closely and rapidly by the method he describes; that the glycerophosphates of lime appear to decompose, even during their preparation; and that undecomposed calcium glycerophosphate seems to require a quantity of acid equivalent to that of the soda necessary to act on phenolphthalein in order to react on methyl-orange.—*Fourn. Pharm. Chim.* [6], vii., 5, through *Pharmaceutical Journal*, February 19, 1898.

ARROW-ROOT, CASSAVA AND KOONTI.

In the issue of the *Journal of the American Medical Association* for February 12th, appears a paper having the above title, by A. T. Cuzner, M.D.



Koonti.

The author, after considering the respective merits of arrow-root and cassava as sources of food, then gives an account of the third member of the group.

This plant (*Zamia integrifolia*) is a native of South Florida, and is called "Indian Bread Root." In its foliage it bears a resemblance to the palm and tree fern. In affinity it is nearer the latter than the former. The accompanying figure represents the plant. Its root is the edible portion.

When the poor whites on the east coast are greatly in need of money they go to the woods and dig koonti, finding a ready market for the roots. Indeed, it is the sole occupation of many people. The roots are not cultivated, as they grow wild in abundance. A very fine quality of starch and tapioca is manufactured from them, which may be found at all times in the Key West market.

The starch cells of koonti are muller-shaped, like those of cassava, but smaller. The starch is said to be equal to the best Bermuda arrow-root, and lately its worth as an article of commerce has been fully recognized in Florida. There are a number of factories for its preparation in Southern Florida. A correspondent of the United States Agricultural Department writes: "I ate of a koonti pudding at Miami, and can say that, as it was prepared and served with milk and guava jelly, it was delicious."

The unique industry (in the more limited sense of the word) of the Seminole is the making of the koonti flour. The Indian process is this: The roots are gathered, the earth is washed from them, and they are laid in heaps near the "koonti log." The koonti log, so-called, is the trunk of a large pine tree, in which a number of holes, about 9 inches square at the top, their sides sloping downward to a point, have been cut side by side. Each of these holes is the property of some one of the squaws or children of the camp. For each of the holes, which serve as mortars, a pestle made of some hard wood is furnished.

The first step in the process is to reduce the washed koonti to a kind of pulp by chopping it into small pieces and filling with it one of the mortars and pounding it with a pestle. The contents of the mortar are then laid upon a small platform; each worker has one. When a sufficient quantity of the root has been pounded, the whole mass is thoroughly saturated with water in a vessel made of bark. The pulp is then mashed in a straining cloth, the starch of the koonti draining into a deer hide suspended below. When the starch has been thoroughly washed from the mass the latter is thrown away, and the starchy sediment in the water left to macerate. After some days the sediment is taken from the water and

spread upon palmetto leaves to dry. When dried, it is a yellowish white flour, ready for use.

In the factories this process is substantially followed, but with improved appliances, the chief variation being that the koonti starch undergoes several successive macerations, thereby making it purer and whiter than the Indian product.

The koonti bread made by the Indians is of a bright orange color. It is rather insipid, though not unpleasant to the taste. It is made without salt. Its yellow color is due to the fact that the flour has had but one maceration.

NEATSFOOT OIL.

J. H. Coste and E. J. Parry (*The Journal of the Society of Chemical Industry*, Vol. xvii, p. 4) state that very little information of a reliable character has been published concerning this oil. They attribute the deficiency to the difficulty in obtaining genuine samples. Therefore, in order to supply trustworthy data on this subject, the authors examined a sample (I) which was obtained through one of the most reliable trade sources, and two others (II and III) which they prepared themselves with special regard to details for obtaining the oil in a pure condition.

The following is a summary of their results :

| | I. | II. | III. |
|--|------------|------------|------------|
| Specific gravity, D $\frac{15.5^{\circ}}{15.5^{\circ}}$ C. | 0.9163 | 0.9:69 | 0.9174 |
| Temperature rise with sulphuric acid (equal vols.) . . . | 51° C. | 58° C. | 56° C. |
| Viscosity at 140° F. } (Redwood's viscosimeter) . . . | 74 sec. | 70 sec. | — |
| “ “ 200° F. } . . . | — | 43 “ | — |
| Iodine absorption by Hübl's method | 65.2 p. c. | 71.1 p. c. | 72.4 p. c. |
| Percentage of potash (KOH) for saponification | 18.9 | { 19.55 } | 19.74 |
| ¹ Free acid (calculated as oleic acid) | — | Trace. | 0.37 |
| “ (saturates KOH) | — | — | 0.07 |
| Insoluble fatty acids (by Hehner's method) | — | 95.3 | 95.5 |

¹ Redetermined after keeping ten months: II, 0.14; III, 0.38.

The authors observe that the above figures show that the samples of known neatsfoot oil more closely resemble one another than they do the trade sample.

The fatty acids of these three samples were obtained by saponifying large quantities of the oil, washing with water and drying at 100° C. An analysis of these gave results as follows:

| | I. | II. | III. |
|---|--------|----------|----------|
| Specific gravity D $\frac{100^{\circ}}{100^{\circ}}$ C. | | 0.8742 | 0.8800 |
| Iodine absorption | 68.4 | 74.5 | 75.8 |
| Percentage of potash (KOH) for neutralization | 19.17 | 20.12 | 20.06 |
| Mean combining weight | 292 | 279 | 280 |
| Solidifying point | — | — | 26.1 |
| Melting point | 30° C. | 29.2° C. | 28.5° C. |

In each case the fatty acids were nearly white, crystalline and almost odorless.

Of ten other samples of oil examined by the authors two agreed reasonably well with the pure samples already mentioned. One contained a considerable proportion of paraffin and the rest appeared to contain other mineral oils, with cotton-seed and probably linseed oil. The fatty acids of two of these samples were prepared, and, instead of being almost white, were decidedly yellow.

In discussing the subject of the paper, Mr. E. Grant Hooper said that sophistication of this oil was not only very common, but was also, in many cases, very gross in character. In a batch of eight samples recently brought to his notice, the following variations were observed, viz.: Densities from 0.9048 to 0.9196; saponification values (per cent. of potash), 5.64 — 19.9; iodine absorption, 46.5 — 86.7; acid (oleic), 1.20 — 6.20; refraction, — 3.6 to + 8.2, and one exceptional sample + 43.7. In glancing over the results obtained in the examination of about eighty samples during the year, he found that the acidity ranged from 0.39 to 34 per cent. (as olive seed); and, with reference to the refraction, the readings ranged from — 11 to + 7 and + 57.

Mr. Otto Hehner, in commenting on the above figures, said that they were interesting, but they did not furnish any contribution on the question of genuine neatsfoot oil. He desired to warn chemists against pinning their faith upon any particular number of constants worked out from a small number of samples. Experience invariably showed that the composition of all oils and fats varied considerably. Lard, for instance, showed wide differences, depending upon the feeding of the animals, the position from which the fat was taken, etc. He would have been interested if the authors had somewhat more closely examined the unsaturated portion of the oil, with a view to ascertain whether less saturated glycerides were contained in it than oleine.

EDITORIAL.

THE NATIONAL FORMULARY.

We are led to make some additional remarks on this subject by the recent appearance of "An Epitome of the National Formulary of Unofficial Preparations," compiled by the Cincinnati Academy of Pharmacy. Associated with this as part two is "The Academy of Pharmacy Formulary." The two make a small pocket volume of eighty-seven pages, handsomely bound in leather, and intended for distribution among the physicians of Cincinnati.

While this method of bringing the National Formulary to the attention of physicians is not new, it is, nevertheless, an excellent one. It has been suggested in numerous president's addresses before State pharmaceutical associations; it has been proposed time and again by members, but the actual carrying out of the plan has progressed slowly. Probably the Kentucky Pharmaceutical Association, in 1895, was one of the first to issue an epitome. The Pennsylvania Association appointed a committee in 1896 to exhibit National Formulary preparations at the meeting of the State Medical Association in 1897. According to the report of that committee (*Proc. Penna. Phar. Asso.*, 1897, p. 50) "they distributed 300 copies of an epitome of the N. F., and 2,000 samples," and the association appointed another committee to continue the work. The chairman of that committee, Mr. Stedem, has asked the Philadelphia College of Pharmacy to assist them. The invitation has been accepted, and a committee of the College appointed. We believe if this plan of issuing literature and samples be persistently advanced it will cause a better feeling between physicians and pharmacists. Some physicians are hoodwinked by the assertion that fine preparations can only be made on a large scale; some appear to be ignorant of any reasons against prescribing proprietary, trade-marked or patented preparations, and a few are too lazy to resist the agent of the proprietary goods, and order them from him or through their pharmacist out of sheer inability to resist him. Every pharmacist should become an active agent of the N. F. preparations.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

NOZIONI DI ZOOCHIMICA. Del Dott. Icilio Guareschi, Professore ordinario di Chimica Farmaceutica e Tossicologica nella R. Università di Torino. Unione Tipografico-Editrice, Torino, 1898.

The introduction to the book proper consists of a history of animal chemistry and its relation to chemistry in general; it also draws a comparison between the constituents of plants and animals and shows their relation. Practically all of the 271 quarto pages are devoted to the consideration of the subject under two parts as follows:

Part I. Substances constituting the animal organism.

Part II. Studies of the animal organs, tissues and liquids.

The first part begins with the elementary gases, water, mineral solids, and gradually leads up to the following classes of more complex compounds, viz.: Albuminoids and their derivatives; compounds nitrogenous, but not albuminous; non-nitrogenous substances, as the oils, sugars, phenols, lactic acid, etc.

The second part treats of the blood, tissues and bones, glandular secretions

urine and urine sediments, and finally animal concretions. The value of the whole work is enhanced by 125 well-executed illustrations, those of urinary sediments being especially noteworthy; in fact the whole subject of urine and its analysis is very fully considered.

This book is a valuable addition to the author's work on analytical chemistry noticed in this JOURNAL two months ago.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AT THE FORTY-FIFTH ANNUAL MEETING, HELD AT LAKE MINNETONKA, MINNESOTA, AUGUST, 1897.

The Proceedings appear this year without any startling novelties. The one part not touched on in this JOURNAL in the report of the meeting previously published is the Report on the Progress of Pharmacy. This year it is fully up to its usual standard of excellence. The introductory is particularly appropriate, and although the editor must have difficulty in adapting himself to the new order of things, he gives no hint of his troubles, but sets himself energetically about considering the various matters which have crowded into modern pharmacy, from "substitution" to the "new woman."

THE YEAR-BOOK OF TREATMENT FOR 1898. A critical review for practitioners of the medicine and surgery. Lea Brothers & Co., Philadelphia and New York.

In this work of 484 pages will be found a valuable epitome of the year's progress in all branches of practical medicine. Not the least interesting is the Summary on Therapeutics, which is chiefly occupied with the consideration of new remedies. In treating of these the contributor has been conservative to a commendable degree. The toxic effects of some older remedies have received attention. The whole work is fully up to the high standard of its thirteen predecessors.

UEBER CHRONISCHE VERGIFTUNGEN MIT STEINKOHLENTHEERBENZIN; VIER TODESFÄLLE. Zusammenge stellt von C. G. Santesson, Professor der Pharmacology in Stockholm. Reprint from *Archiv für Hygiene*, Bd. 31, Heft 4, 1898.

The increased use of benzol in the industrial arts has brought to light numerous cases of workmen suffering from the ill effects of the vapors; this is especially the case where the liquid is used as a solvent for rubber. Authorities are quoted to show that it must be considered an active poison, destroying the red corpuscles, causing irregular breathing, weak pulse and convulsions. The poison remains a long time in the body, is slowly oxidized, and passes off in the urine as sulphocarbolic acid.

A number of experiments on dogs are recorded, a close study of the action of the poison on the human subject has been made, and advice is given as to the best means of preserving the health of workmen who are engaged in manufactories where the vapor is liable to be present.

DER EINFLUSS DES ANTIPYRINS AUF CHININHYDROCHLORAT. Von C. G. Santesson. Reprint from the *Skandinavischen Archiv für Physiologie*, Bd. 7, 1897.

The first notice of the influence of antipyrin on the solubility of quinine

hydrochloride was made by an Italian physician, Dr. Triulzi, in 1889. The solution found useful for hypodermic purposes is made as follows :

| | |
|---------------------------------|------------|
| Quinine hydrochloride | 3 grammes. |
| Antipyrin | 2 " |
| Distilled water | 5 " |

The combination is known as "Chinopyrin," and in many ways chemically resembles both the constituents which compose it. Dr. Santesson records experiments on frogs, dogs and the human subject. The results were favorable to the combination, not only because of the greater solubility imparted to the quinine salt, but also on physiological grounds.

ENTWICKLUNGSGESCHICHTLICHE UNTERSUCHUNGEN ÜBER DEN MALABAR CARDAMOMEN, UND VERGLEICHEND ANATOMISCHE STUDIEN ÜBER DIE SAMEN EINIGER ANDERER AMOMUM-UND ELETTARIAARTEN. Inaugural Dissertation, von Adolf Schad. Bern, Switzerland, 1897.

This work was carried out by the author at the Pharmaceutical Institute of Bern, under the direction of Professor Dr. Tschirch. In the introduction the botanical origin and the commercial sources of the cardamon is fully discussed, and an abundance of literary references quoted. This is followed by a section on the comparative anatomy and morphology of the most important ammomum and elettaria fruit. The most important commercial varieties are then considered. Three excellent plates accompany the text.

EXPERIMENTAL UNTERSUCHUNGEN ÜBER DIE ENTSTEHUNG DER HARZ-GALLEN UND VERWANDTER GEBILDE BEI UNSEREN ABIETINEEN. Inaugural Dissertation, von Peter Nottberg. Bern, Switzerland, 1897.

This, like the preceding, was conducted by the author at the Pharmaceutical Institute of the University of Bern, and under the direction of Professor Dr. Tschirch. It is the result of a series of investigations, and is accompanied by a number of excellent illustrations. No abstract can do it justice, and it should be studied in the original.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 15, 1898.

The regular Pharmaceutical Meeting was held in the Museum at 3 P.M., with Joseph W. England in the chair. The minutes of the previous meeting were allowed to stand as published.

A Faradic battery, such as was in use fifty years ago, was received from Mr. Howard B. French as an addition to the collection of the Museum.

Professor Trimble called attention to a peculiar form of crystallization of arsenous oxide. The formation was on the inner surface of a stock-bottle, and was only noticed recently. No examination had been made, however, to determine whether the beautiful etched-like appearance was in reality arsenous oxide or merely a marking on the surface of the glass. Professor Ryan exhibited a bottle having a quite similar appearance on the inner surface, which had never been used as a container at all.

Several papers were read, and the first was on the "Hygiene of the Teeth," by Dr. C. B. Lowe (see page 191).

In discussing the subject of the paper, Professor Trimble remarked upon the value of the solutions of eucalyptus gum for cleansing the teeth, and also upon their antiseptic and healing properties.

The chairman spoke in particular of the virtues of eucalyptus red gum as a local astringent.

The subject was continued by Dr. Lowe, who spoke of the efficiency of red gum tablets for relieving slight irritation of the throat.

The next paper was on the subject of "Formaldehyde," by Geo. L. Taylor, of New York (see page 195). In this the author considered the principles involved in the manufacture of formaldehyde from methyl alcohol, and then described apparatus which he himself designed for the manufacture of the solution on a commercial scale. He also exhibited and described apparatus designed for disinfecting apartments, the gas being generated from the commercial solution.

A question arose as to whether a person would be injured by remaining in a room undergoing disinfection, to which Mr. Taylor replied that, under the best conditions for disinfection, the atmosphere of the room would be unbearable.

A paper by William L. Cliffe, on "Gray's Glycerin Tonic Compound," aroused considerable discussion on the question pertaining to the sale of proprietary articles. Those taking part in it were Messrs. Stedem and Boring and Professor Ryan.

J. W. England read a note on a useful form of filter. It is made as follows: (1) Take a circular sheet of filtering paper and fold upon itself (following the first step of the older plan of plain cone filter), (2) open and infold at right angles to first fold; (3) open and take left and right sides of base of half circle and infold, forming a four-cornered star. Then press the corners of the star upon each other, so that there are formed two outer quarter sections of the sheet of filter paper, with two inner one-eighth sections; open and use. The filter is only of value for the collection and ready washing of small quantities of precipitates. F. G. Ryan stated that the filter had some advantages, and was first recommended, he thought, by the late Professor Bedford, in a paper in his journal, some few years ago.

An interesting part of the programme was a talk on quite a collection of spring flowers and plants by Prof. Henry Kraemer. Calling attention to a specimen of skunk cabbage, he said that the flowers are of biological interest on account of the structure. This he illustrated by diagram, and said that self-fertilization did not seem possible. Besides slugs, he believed that a kind of beetle is also instrumental in the fertilization of the flower. A peculiarity of the roots is the spiral structure of the older ones. Among the other specimens exhibited were iris, which Prof. Kraemer believed should be gathered at this season of the year; ground ivy, sassafras, which he thinks should also be gathered in the spring, pussy willow, poplar, alder, silver maple, white birch, chickweed, yarrow and elder; the latter apparently produces stolens like the strawberry, and thus may form quite a hedge.

He also called attention to a specimen of custard apple which had been grown from seeds sent to Mr. Howard B. French from Samoa.

In talking of plants Prof. Kraemer prefers the common names as being less confusing.

A con joint vote of thanks was tendered Mr. Taylor and Prof. Kraemer for their respective courtesies.

On motion, the meeting adjourned.

THE PHILADELPHIA COLLEGE OF PHARMACY.

The following are the questions given to the First and Second Year classes at their recent examinations. Those on operative pharmacy, botany, analytical chemistry, and pharmacognosy were practical, and conducted in the respective laboratories, the others were written.

FIRST YEAR EXAMINATION, 1898.

THEORY AND PRACTICE OF PHARMACY.

A—(1) Name six liquids in the order of their value, which are used as solvents or menstrua in extracting the active principles of official liquid preparations. (2) Explain briefly the merits and limitations of each solvent or menstruum. (3) Illustrate by an official example the use of each solvent or menstruum. (4) State the advantages of sugar as it is used in liquid pharmaceutical preparations. (5) Why is honey used so seldom as a vehicle in official preparations. (6) What are the properties of acetic acid as a menstruum, and describe its advantages.

B—(1) Describe the official resins. (2) How do those which are not by-products differ from alcoholic extracts? (3) Give the general process for preparing this class of resins. (4) Are the resins found in plant-drugs always the active principles of the plant? (5) In making official extracts, explain how you may vary the yield of the extract.

CHEMISTRY.

C—(1) Write the chemical formulas of: Hydrogen Sulphide, Hydrogen Sulphite, Hydrogen Sulphate, Ferrous Sulphide, Sodium Sulphite, Calcium Sulphate. (2) Describe Hydrogen Sulphide, and state how it is prepared.

D—(1) What is *Carbo Ligni*, and how is it prepared, and what are its uses? (2) What is *Carbo Animalis*, how is it prepared, and what are its uses? (3) Describe the two oxides of Carbon, and state how you could distinguish between them.

MATERIA MEDICA AND BOTANY.

PHYSIOLOGY.

E—The Blood.—(1) Give the constitution of the blood. (2) How can the blood of human beings be told from that of fowls or fishes? (3) What is its coloring principle called? (4) State briefly the difference in composition of blood before and after coagulation. (5) What is the difference between blood and lymph? *The Heart.*—(6) State its normal size, and situation in the body. (7) Name the four cavities of the heart, and the four valves and their situations. (8) What are the names given to indicate the contraction and relaxation of the heart? (9) State briefly the systemic circulation. (10) Name the artery and its situation at which we can best feel the pulse. *The Lungs.*—(11) In what cavity are the lungs situated, and by what membrane are they surrounded? (12) Commencing above and proceeding downwards, name the parts of the respiratory apparatus. (13) State the number of respirations per

minute; how do they correspond with the pulse? (14) What do we mean by the "tidal volume" of air? (15) In the air we breathe, what per cent. of carbon dioxide (produced by respiration) is harmful to life, and how is it best detected?

BOTANY.

F—(1) What is the color of herb and leaf drugs when not properly dried? What is the cause? How prevented? (2) To what is the green color of essence of peppermint due? (3) What are galls? How are they produced? In what constituent are they particularly rich? On what plant are the official nutgalls produced? (4) Explain what you understand by the stigma and pollen grains of a flower? (5) Mention an official drug which consists of stigmas only. (6) Of what importance are pollen grains in the identification of drugs? (7) State briefly the characteristics of the flowers of the Compositæ. Give two drug examples. (8) What is a seed? What part of the seed is mace?

COMMITTEE.

G—(1) What chemical elements are present in Borax? (2) What is the official name of Borax? (3) From what source is Borax obtained, and in what localities is it found? (4) What acid is obtained from Borax? (5) Does this acid occur free in nature and where? (6) What is the best solvent for this acid? (7) What are its medical properties and uses? (8) Name an official preparation in which this acid and solvent are used. (9) Is this preparation a chemical compound or a solution? (10) What is Borax-glass?

H—(1) What is the effect of heat upon the organic principles of plant drugs? (2) Describe a method of extracting the soluble principles of plant drugs without the use of heat, as in making fluid-extracts. (3) In the official process for making extracts, how is the end of the process indicated? (4) What are powdered extracts? (5) Describe their advantages and disadvantages.

I—A customer desiring to provide himself with sufficient of the following mixture to last him during a sixty days' trip to Florida, requested the apothecary to furnish it:

| | | |
|---|---------------------------|--------|
| R | Hydrarg. Chlor. Corros. | gr. i |
| | Potass. Iodid. | ʒ v |
| | Tr. Gentian. Comp. | f ʒ iv |
| | Syr. Stillingia Comp. | f ʒ ii |
| | Aqua Chloroformi, to make | f ʒ iv |

M. Sig.—A teaspoonful three times a day.

Write out in full a formula for the quantity necessary for the trip.

K—Briefly describe what you understand by the following, and give drug examples of each: (a) Rhizome; (b) Simple Leaf; (c) Complete Flower; (d) Inferior Ovary; (e) Superior Ovary; (f) Follicle; (g) Capsule; (h) Inferior Drupe; (i) Cremocarp; (j) Albuminous Seed.

OPERATIVE PHARMACY.

Write your name and examination number on each label. Restore all containers to their proper places before leaving. Articles marked with an (*) are weighed.

(1) *Granulated Salt.*

* Ammonium Chloride 30 gm.
Purify and Granulate.

(2) *Ointment of Mercuric Nitrate.*

* Mercury 2.5 gm.
Nitric Acid 3' c.c.
Nitric Acid 2' c.c.
Lard Oil 30' c.c.

Make Ointment of Mercuric Nitrate by the official process.

(3) *Suppositories.*

Glycerin 8 c.c.
Sodium Carbonate 0.50 gm.
Stearic Acid 0.85 gm.

Make six suppositories, and put them in a small wide-mouth bottle.

PRACTICAL BOTANY.

(1)—*Stramonium Specimen*.—Describe the stem, leaf, flower, fruit and seed.

(2)—*Menispermum*.—Make sections and determine (a) whether root or rhizome; (b) monocotyledon or dicotyledon. Draw a diagram of the structure and indicate the tissues and their arrangements.

(3)—*Arrow-root*.—A sample purchased for arrow-root. Determine its purity and state whether you would accept or not. On what do you base your determination?

(4)—*Powdered Rhubarb*.—Determine its purity and state on what you base your determination.

SECOND YEAR EXAMINATION.

THEORY AND PRACTICE OF PHARMACY.

A—Ammonia Preparations.—(1) State briefly how Ammonia Water is prepared. (2) What percentage of Ammonia Gas is contained in each official Ammonia Water? (3) Name the ingredients in Aromatic Spirit of Ammonia. (4) How is Spirit of Ammonia prepared? (5) What decomposition occurs in Ammonium Carbonate when it is exposed to the air? (6) State how such a depreciated salt may be improved.

B—Products of Destructive Distillation.—(1) What official empyreumatic oleoresin is obtained by the destructive distillation of pine wood? (2) Name two official preparations of this oleoresin. (3) Give the official title of the volatile oil obtained from this oleoresin. (4) Describe the physical appearance of the residue left in the still. (5) What official empyreumatic oleoresin is obtained by the destructive distillation of the wood of a juniper? (6) What are its physical properties and medicinal uses?

C—Vinous Fermentation.—(1) What are the requisite elements in developing vinous fermentation in organic products? (2) How is Alcohol made? (3) How would you deprive Alcohol of its last 2 per cent. of water? (4) How is Alcohol freed from odorous products? (5) How is Ether made?

D—Volatile Oils.—(1) How is Oil of Bitter Almond made from bitter almonds? (2) What acid is found in such an oil? (3) How is Oil of Bitter Almond made synthetically? (4) What poor substitute is sometimes sold for Oil of Bitter Almond? (5) What is the dose of Oil of Bitter Almond?

E—Saponification.—(1) What is Soap? (2) What are the by-products resulting from the manufacture of Soap? (3) What is the official name and definition of Soap? (4) How are the finer grades of Soap perfumed? (5) What are the official preparations of Soap?

CHEMISTRY.

F—(1) What is the official name of "Bleaching Powder," and what is its formula? (2) Describe its manufacture. (3) Which is the more efficient bleaching and oxidizing agent, chlorine or bromine? (4) State the reasons for your opinion.

G—(1) What is "Plaster of Paris" and how is it made? (2) What is the chemical distinction between a "fat" lime and a "lean" lime? (3) What are the chemical differences between a common mortar and a cement?

H—(1) Describe the Metal Mercury and note its special physical properties. (2) Give the formula of the official chlorides of mercury and note their points of difference. (3) Do the same with the official oxides. (4) What valuable pigment have we among the mercury compounds?

I—(1) Describe the Metal Lead, noting its appearance and physical properties. (2) Give the official and common names of its most important official compounds. (3) What is the chemical composition of *Red Lead*, of *White Lead*? (4) What other well-known pigments besides these are there containing Lead?

K—(1) Enumerate the most valuable Ores of Iron. (2) How is the metal extracted commercially and what names do the several products bear? (3) By what test do you distinguish between Ferrous and Ferric compounds?

MATERIA MEDICA.

L—Alkaloids.—(1) Name two which are mydriatics. (2) Two which are myotics. (3) One which is a tæniifuge. (4) Two which are antimalarial. (5) One (derived from a leaf drug) which is a local anesthetic. (6) One which is a powerful sialagogue and diaphoretic. (7) One (derived from a root drug) which is powerfully emetic. (8) One (derived from an umbelliferous fruit) which is poisonous. (9) One derived from an official tuberous root. (10) A yellow alkaloid obtained from a number of plants belonging to Ranunculaceæ and Berberidaceæ. *Doses.*—State the maximum dose of each of the following: (11) Strychnine. (12) Phyostigmine. (13) Digitalin (amorphous). (14) Digitalin (crystalline). (15) Pilocarpine. (16) Quinine. (17) Cocaine. (18) Belladonna Leaves. (19) Hyoscyamus. (20) Aconite.

M—The Cinchonas.—(1) Under what titles are they official? (2) Name the species from which each is derived. (3) Give the alkaloidal strength as required by the U.S.P. (4) Name their habitat, and the range of mountains on which they grow. (5) In what countries are they cultivated? (6) What is meant by the terms "mossed bark" and "renewed bark"? (7) State the principle modes of collection. (8) What per cent. of alkaloids do the cultivated

barks frequently yield? (9) State Grahe's test. (10) Which of the alkaloids give the green "thalleioquin" color with chlorine water and ammonia?

N—Roots, Barks, Leaves, etc.—Give the official names, botanical origins, natural orders, and habitats of each of the following: (1) Muskrout. (2) Pokerrout. (3) Blue Cohosh. (4) Cascara Sagrada. (5) Wahoo (6) Irish Broom. (7) Jaborandi. (8) Jimson Weed. (9) Henbane. (10) Foxglove.

O—Collection, Adulterations and Constituents.—(1) Taraxacum, what time of the year should it be gathered, and why? (2) What kind of digitalis leaves should be gathered? (3) What kind of belladonna root should be rejected? (4) What false Pareiras are sometimes seen in the market? (5) What is false Sumbul? (6) Is jalap better or worse for being worm eaten? State the reasons for your decision. (7) What rhizome is sometimes sold in place of spigelia? (8) What adulterations are seen in Alexandria senna? (9) Name the glucoside and enzyme present in bitter almond. (10) What action takes place between them in the presence of moisture?

P—Drugs Containing Glucosides, etc.—Give the official names, botanical origins, natural orders, and habitats of the drugs which contain the following principles: (1) Picrasmin; (2) Quinovin; (3) Convallamarin; (4) Jalapurgin; (5) Daphnin; (6) Gentiopicroin; (7) Salicin; (8) Santonin; (9) Cathartic Acid; (10) Daturine.

ANALYTICAL CHEMISTRY.

Each student was required to qualitatively determine the composition of a mixture of several salts. The substance was in the form of powder.

PHARMACOGNOSY.

A—Identify the following specimens. State exactly how you arrive at your conclusion. Draw the characteristic cell structures or cell contents. Give an opinion of purity: (1) Powdered anise; (2) Crocus; (3) Powdered red cinchona; (4) Powdered mustard; (5) Lupulin.

B—Name the following crude drugs with which are also microscopic sections: (6) Fennel; (7) Mexican sarsaparilla; (8) Hyoscyami folia; (9) Stramonii folia; (10) Belladonnæ folia.

Corundum in the United States.—The production of corundum in the United States in 1897 was 230 short tons, against 250 short tons in 1896. In each year the product was derived entirely from North Carolina, where the Hampden Corundum and Emery Company, which operates the Corundum Hill mines in Macon County, is the chief producer. Besides this concern, there were two small producers, namely, the Turkey Knob Corundum Company and the Savannah Mining Company. The conditions in the abrasive trade of the United States at the present time are such as to discourage the production of corundum here. At present prices it is doubtful if the mining of corundum in North Carolina can be carried on at a profit.—*The Journal of the Society of Chemical Industry*, January 31, 1898.